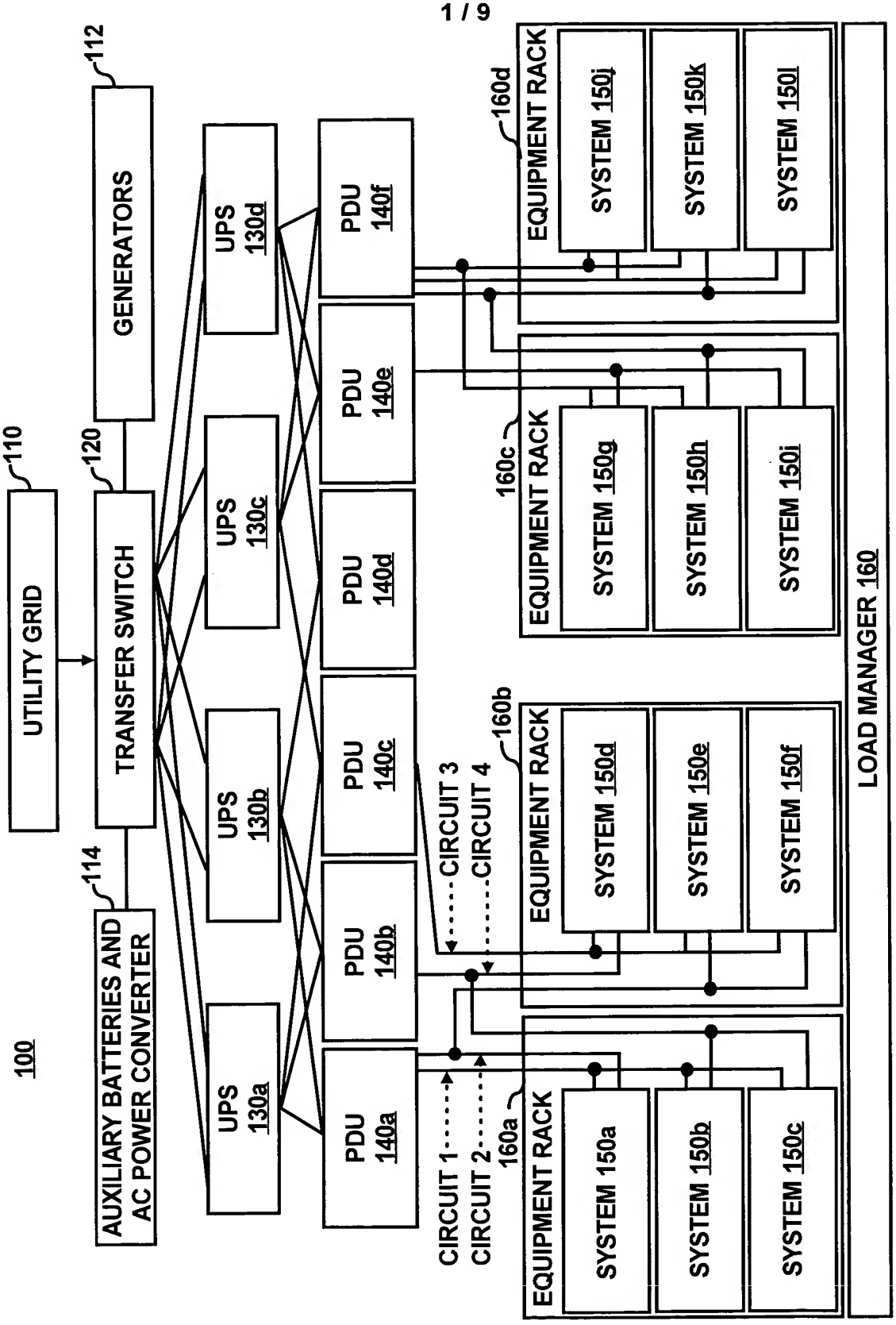

100
UTILITY GRID
110
TRANSFER SWITCH
120
GENERATORS
112
AUXILIARY BATTERIES AND AC POWER CONVERTER
114
UPS 130a
UPS 130b
UPS 130c
UPS 130d
PDU 140a
PDU 140b
PDU 140c
PDU 140d
PDU 140e
PDU 140f
CIRCUIT 1
CIRCUIT 2
CIRCUIT 3
CIRCUIT 4
160a
EQUIPMENT RACK
SYSTEM 150a
SYSTEM 150b
SYSTEM 150c
160b
EQUIPMENT RACK
SYSTEM 150d
SYSTEM 150e
SYSTEM 150f
160c
EQUIPMENT RACK
SYSTEM 150g
SYSTEM 150h
SYSTEM 150i
160d
EQUIPMENT RACK
SYSTEM 150j
SYSTEM 150k
SYSTEM 150l
LOAD MANAGER 160

FIG. 1

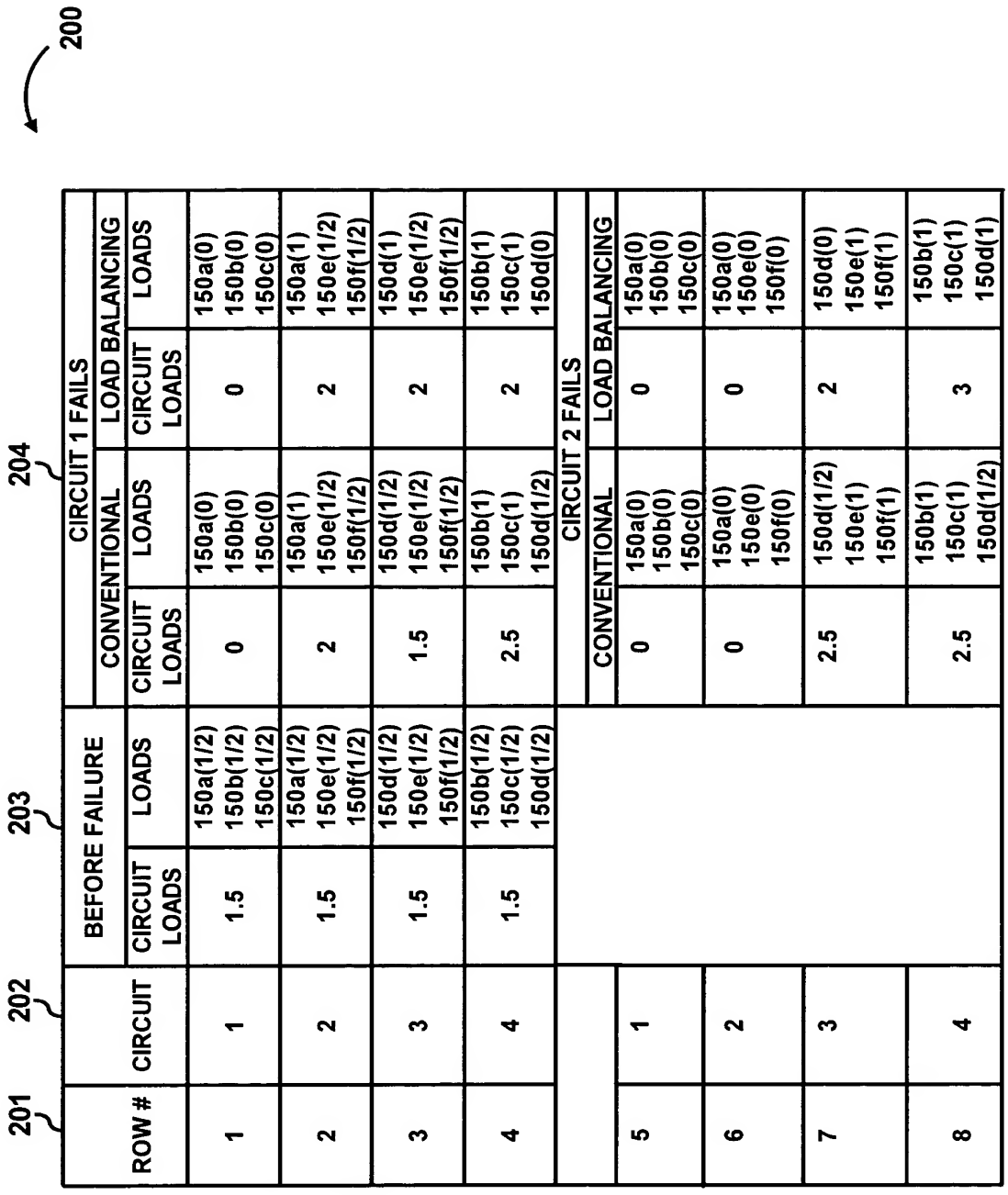
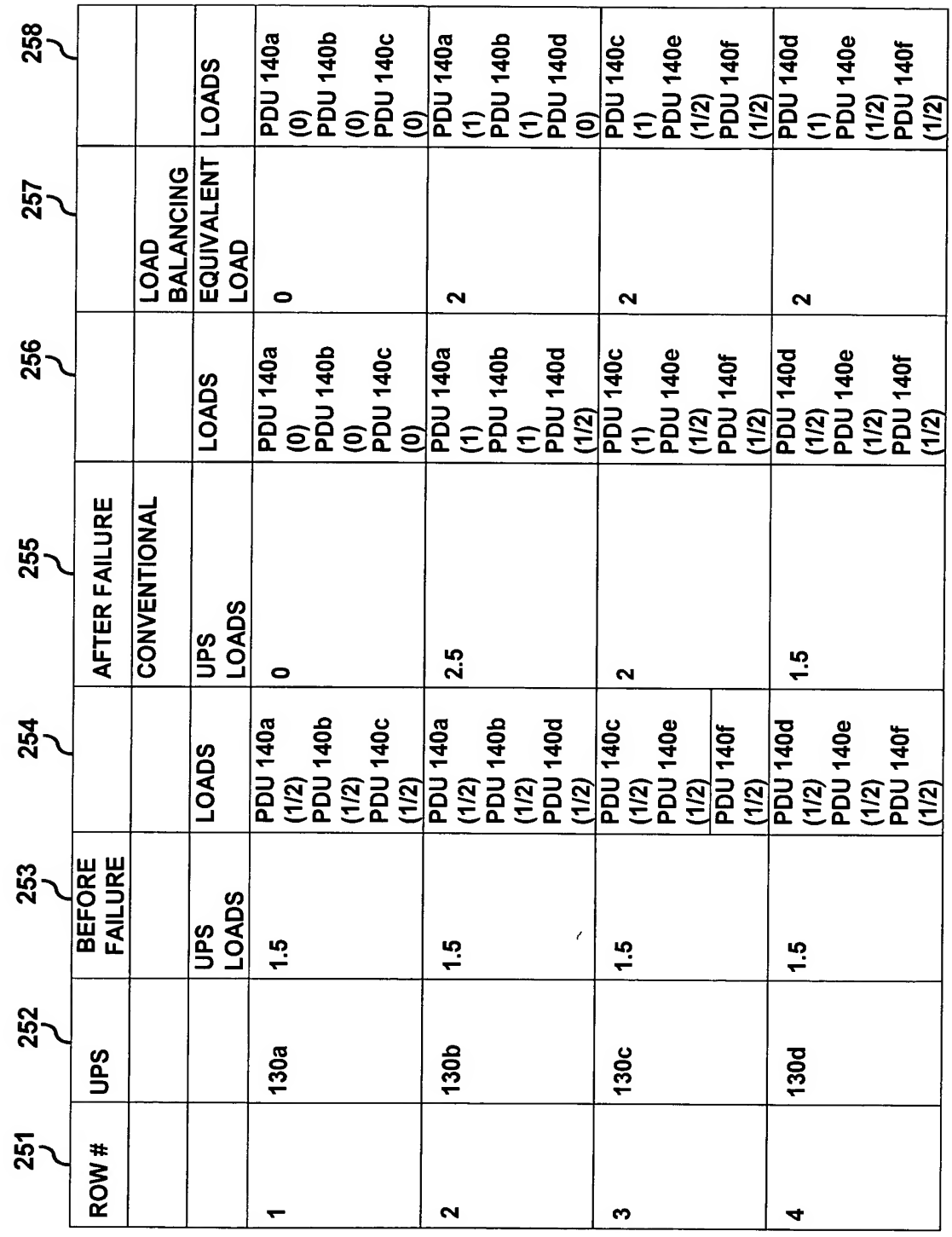

200
201
202
203
204
ROW #
CIRCUIT
BEFORE FAILURE
CIRCUIT LOADS
LOADS
CIRCUIT 1 FAILS
CONVENTIONAL
CIRCUIT LOADS
LOADS
LOAD BALANCING
CIRCUIT LOADS
LOADS
1 1 1.5 150a(1/2) 150b(1/2) 150c(1/2) 0 150a(0) 150b(0) 150c(0) 0 150a(0) 150b(0) 150c(0)
2 2 1.5 150a(1/2) 150e(1/2) 150f(1/2) 2 150a(1) 150e(1/2) 150f(1/2) 2 150a(1) 150e(1/2) 150f(1/2)
3 3 1.5 150d(1/2) 150e(1/2) 150f(1/2) 1.5 150d(1/2) 150e(1/2) 150f(1/2) 2 150d(1) 150e(1/2) 150f(1/2)
4 4 1.5 150b(1/2) 150c(1/2) 150d(1/2) 2.5 150b(1) 150c(1) 150d(1/2) 2 150b(1) 150c(1) 150d(0)
CIRCUIT 2 FAILS
CONVENTIONAL
LOAD BALANCING
5 1 0 150a(0) 150b(0) 150c(0) 0 150a(0) 150b(0) 150c(0)
6 2 0 150a(0) 150e(0) 150f(0) 0 150a(0) 150e(0) 150f(0)
7 3 2.5 150d(1/2) 150e(1) 150f(1) 2 150d(0) 150e(1) 150f(1)
8 4 2.5 150b(1) 150c(1) 150d(1/2) 3 150b(1) 150c(1) 150d(1)

FIG. 2A



251 ROW #	252 UPS	253 BEFORE FAILURE	254	255 AFTER FAILURE	256	257	258
				CONVENTIONAL		LOAD BALANCING	
		UPS LOADS	LOADS	UPS LOADS	LOADS	EQUIVALENT LOAD	LOADS
1	130a	1.5	PDU 140a (1/2) PDU 140b (1/2) PDU 140c (1/2)	0	PDU 140a (0) PDU 140b (0) PDU 140c (0)	0	PDU 140a (0) PDU 140b (0) PDU 140c (0)
2	130b	1.5	PDU 140a (1/2) PDU 140b (1/2) PDU 140d (1/2)	2.5	PDU 140a (1) PDU 140b (1) PDU 140d (1/2)	2	PDU 140a (1) PDU 140b (1) PDU 140d (0)
3	130c	1.5	PDU 140c (1/2) PDU 140e (1/2) PDU 140f (1/2)	2	PDU 140c (1) PDU 140e (1/2) PDU 140f (1/2)	2	PDU 140c (1) PDU 140e (1/2) PDU 140f (1/2)
4	130d	1.5	PDU 140d (1/2) PDU 140e (1/2) PDU 140f (1/2)	1.5	PDU 140d (1/2) PDU 140e (1/2) PDU 140f (1/2)	2	PDU 140d (1) PDU 140e (1/2) PDU 140f (1/2)

FIG. 2B

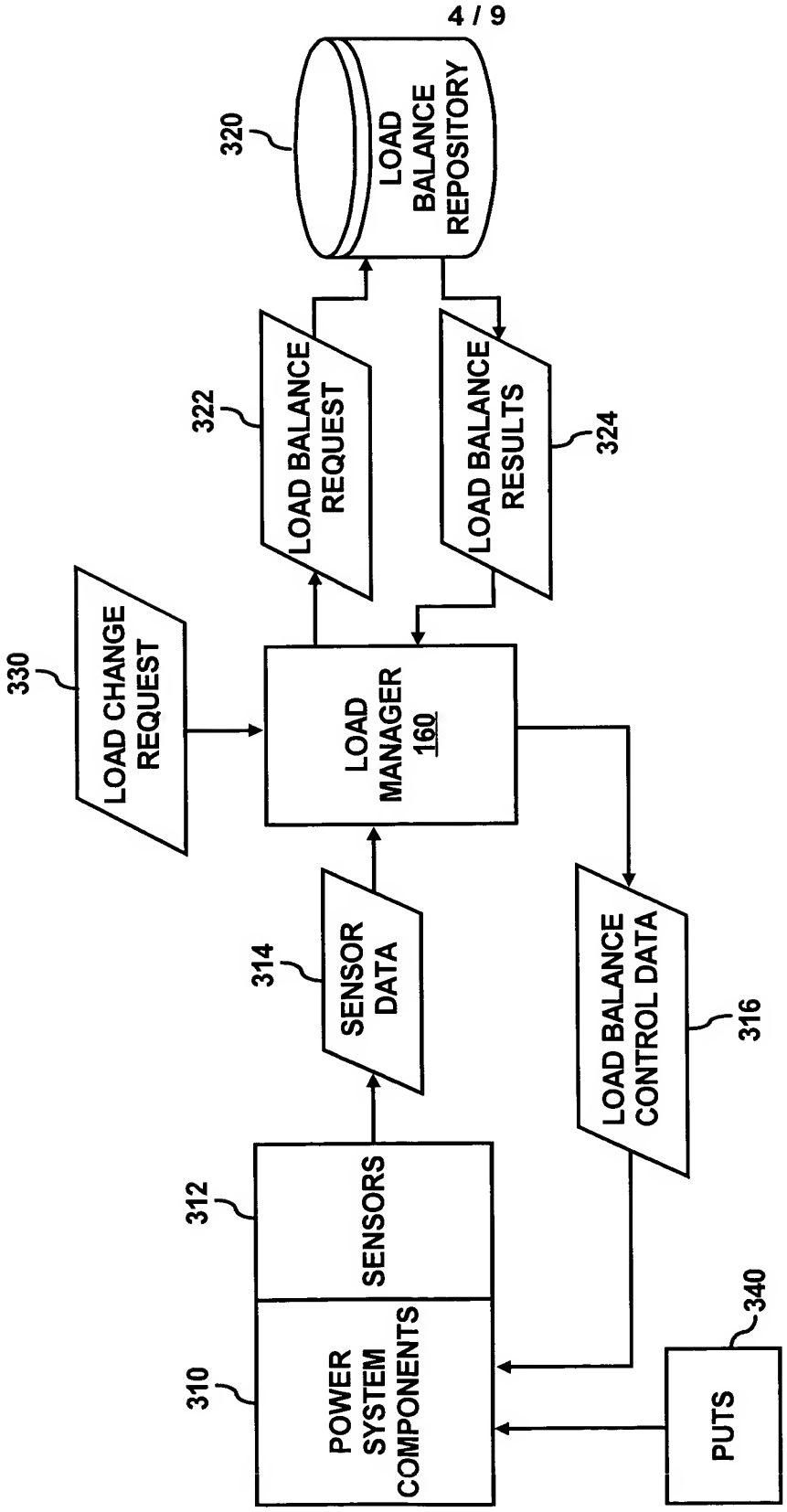

320
LOAD BALANCE REPOSITORY
322
LOAD BALANCE REQUEST
324
LOAD BALANCE RESULTS
330
LOAD CHANGE REQUEST
LOAD MANAGER 160
314
SENSOR DATA
316
LOAD BALANCE CONTROL DATA
312
SENSORS
310
POWER SYSTEM COMPONENTS
340
PUTS

FIG. 3

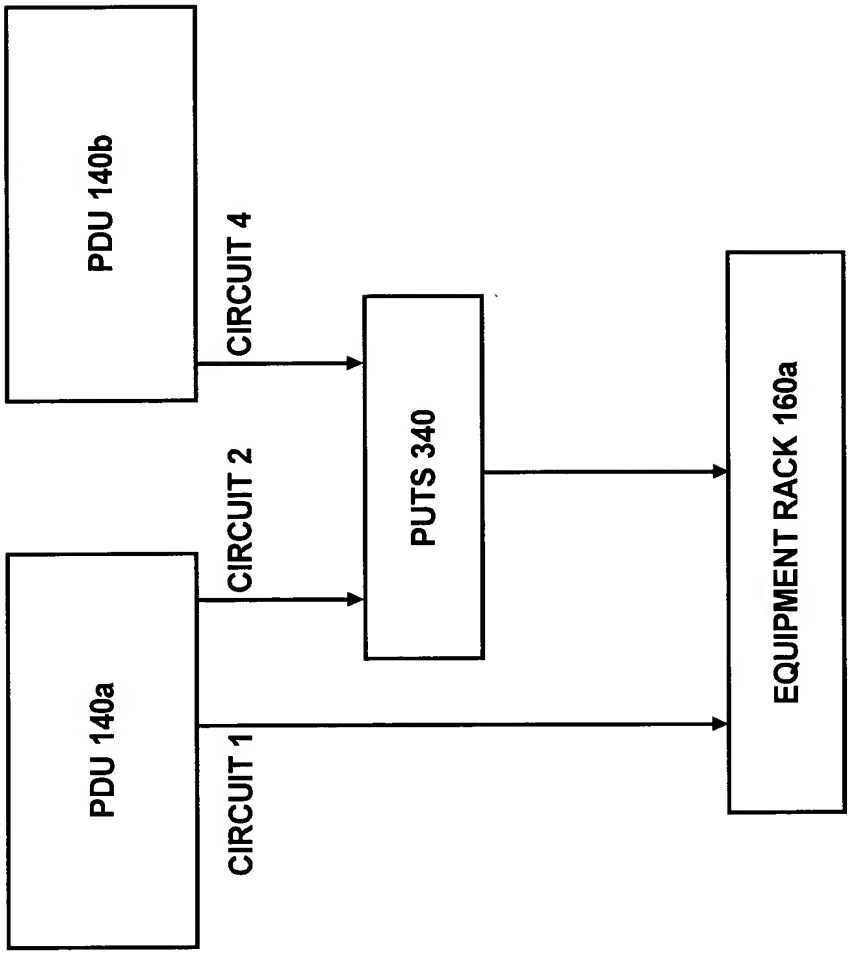

PDU 140b
CIRCUIT 4
CIRCUIT 2
PUTS 340
PDU 140a
CIRCUIT 1
EQUIPMENT RACK 160a

FIG. 4

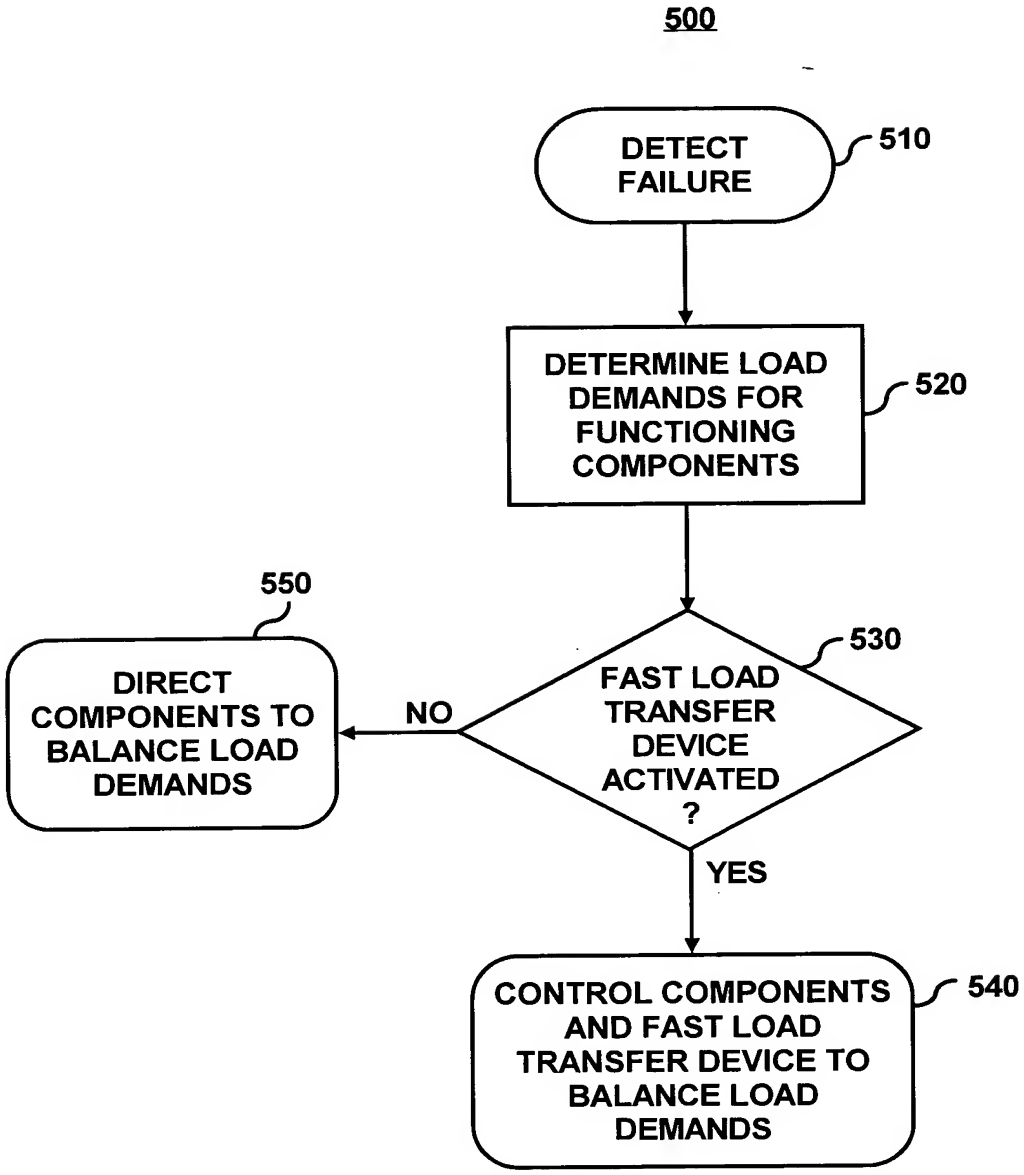

500
DETECT FAILURE
510
DETERMINE LOAD DEMANDS FOR FUNCTIONING COMPONENTS
520
FAST LOAD TRANSFER DEVICE ACTIVATED ?
530
NO
DIRECT COMPONENTS TO BALANCE LOAD DEMANDS
550
YES
CONTROL COMPONENTS AND FAST LOAD TRANSFER DEVICE TO BALANCE LOAD DEMANDS
540

FIG. 5

600

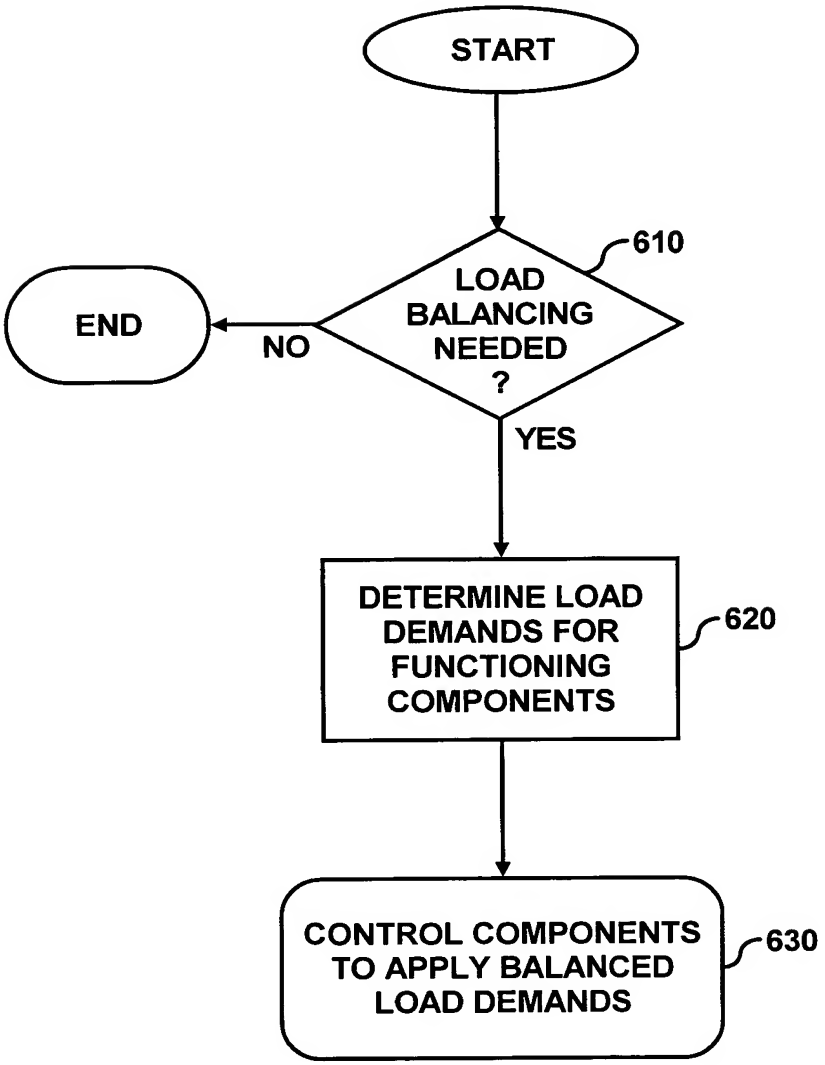

START
610
LOAD BALANCING NEEDED ?
END
NO
YES
DETERMINE LOAD DEMANDS FOR FUNCTIONING COMPONENTS
620
CONTROL COMPONENTS TO APPLY BALANCED LOAD DEMANDS
630

FIG. 6

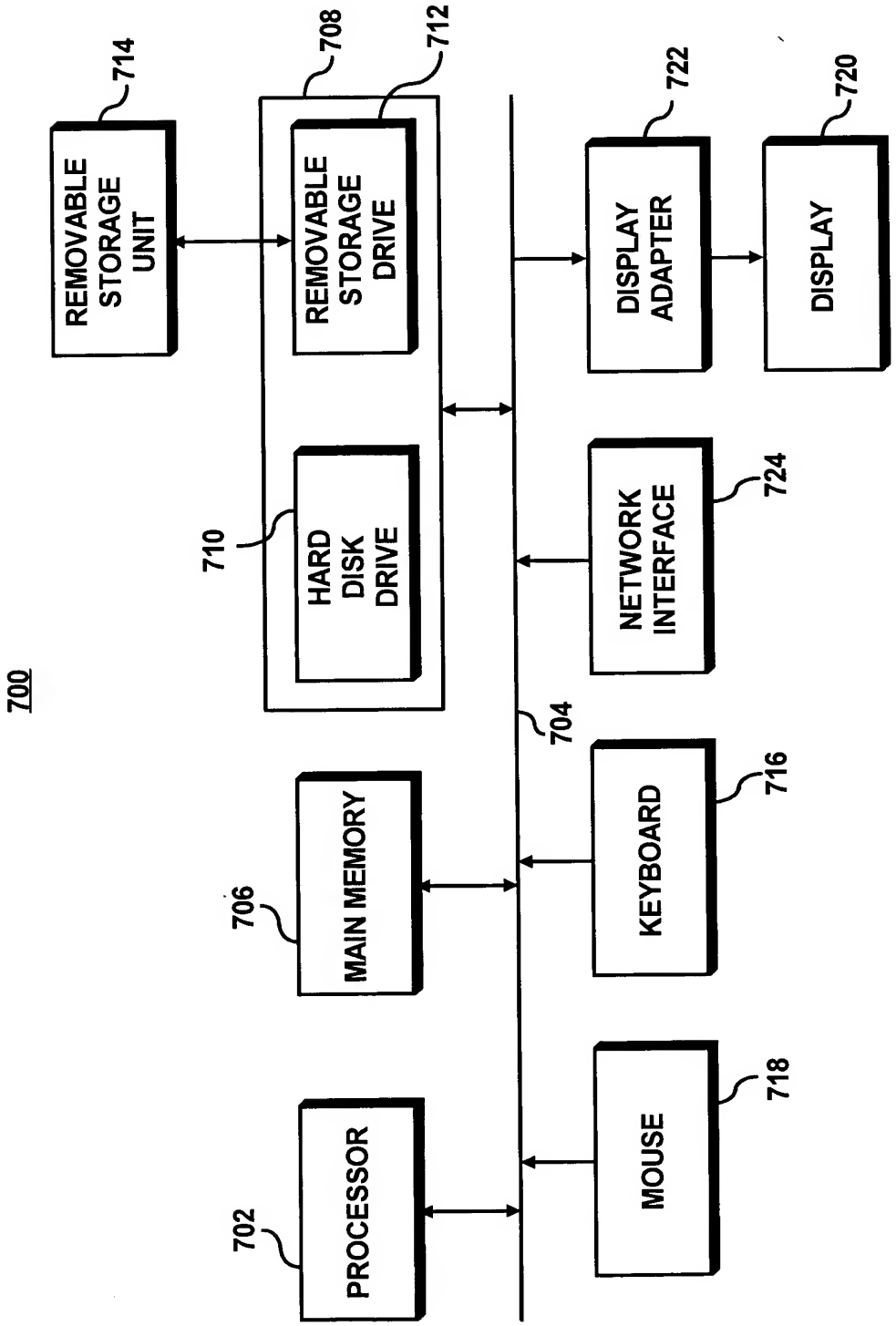

700
REMOVABLE STORAGE UNIT
714
REMOVABLE STORAGE DRIVE
708
712
HARD DISK DRIVE
710
DISPLAY ADAPTER
722
DISPLAY
720
NETWORK INTERFACE
724
704
MAIN MEMORY
706
KEYBOARD
716
PROCESSOR
702
MOUSE
718

FIG. 7

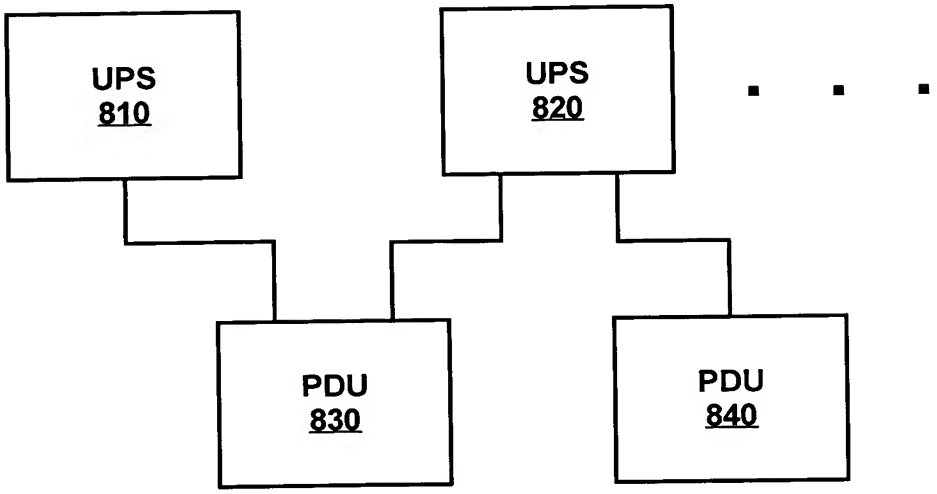


FIG. 8
(PRIOR ART)